

Human-Water Interaction Human-Nature Interaction

- from the geochemical point of view -



Takahito YOSHIOKA

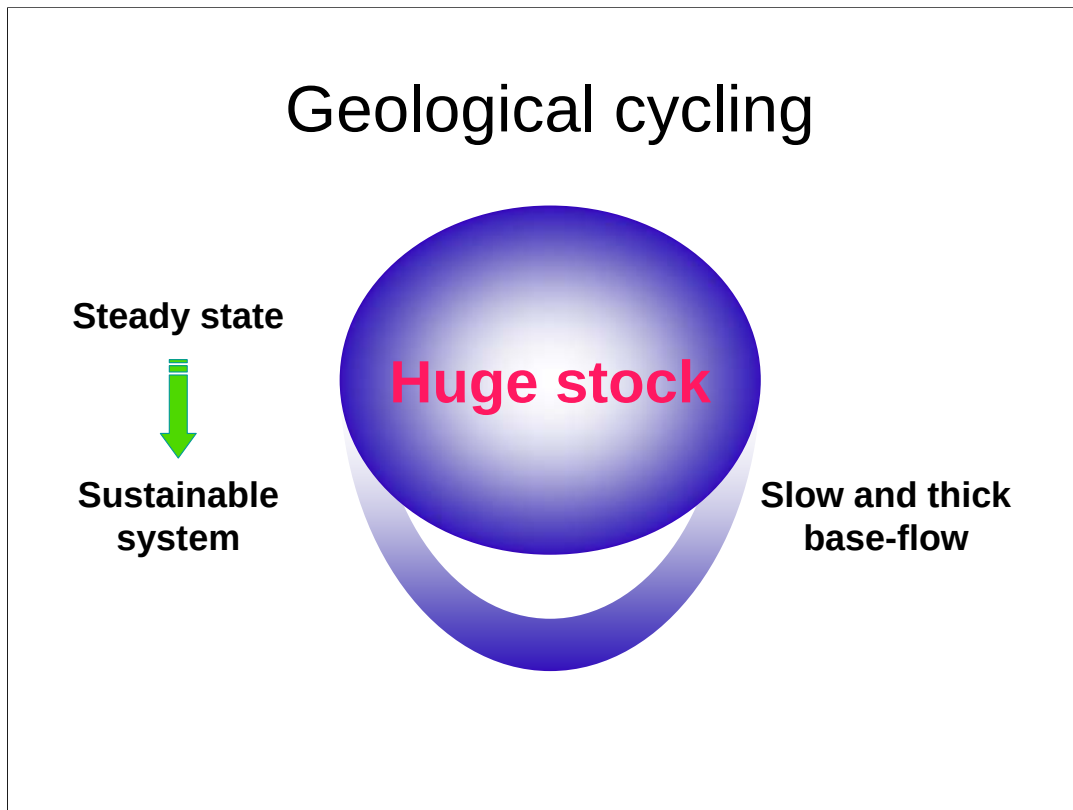
The RIHN 1st International Symposium "Water and better human life in the future", November 6-8, Kyoto International Conference Hall, Kyoto, Japan (11/8).

the comment in the Session II

Human-Water Interaction and Human-Nature Interaction
- from the geochemical point of view -
Takahito YOSHIOKA, RIHN

Slide 1

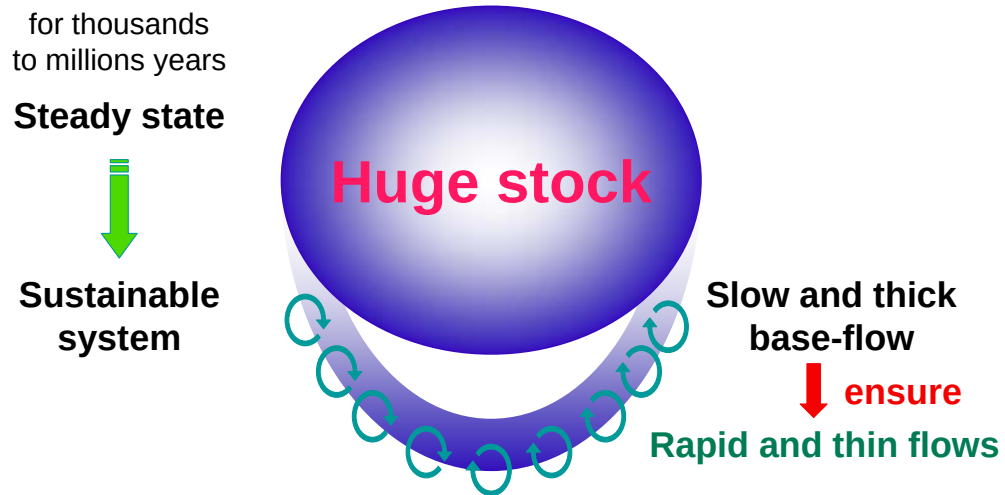
The Human-Water and Human-Nature Interactions (HWI and HNI) are overviewed from the viewpoint of geochemical material cycling, and the relevant future directions are conceptually discussed.



Slide 2

Stock (pool or mass), process and flow (flux) are essential elements of the geochemical cycling. A huge stock of the material is essential for stabilizing the material cycling. In the geological material cycles, the huge stock sustains slow and thick flows, for example, the deep ocean water flow, the plate tectonic movement, the atmospheric circulation and so on. The earth system seems to be at steady state in the geological scale. It means the system to be sustainable, although even the universe is not stable for over billions years.

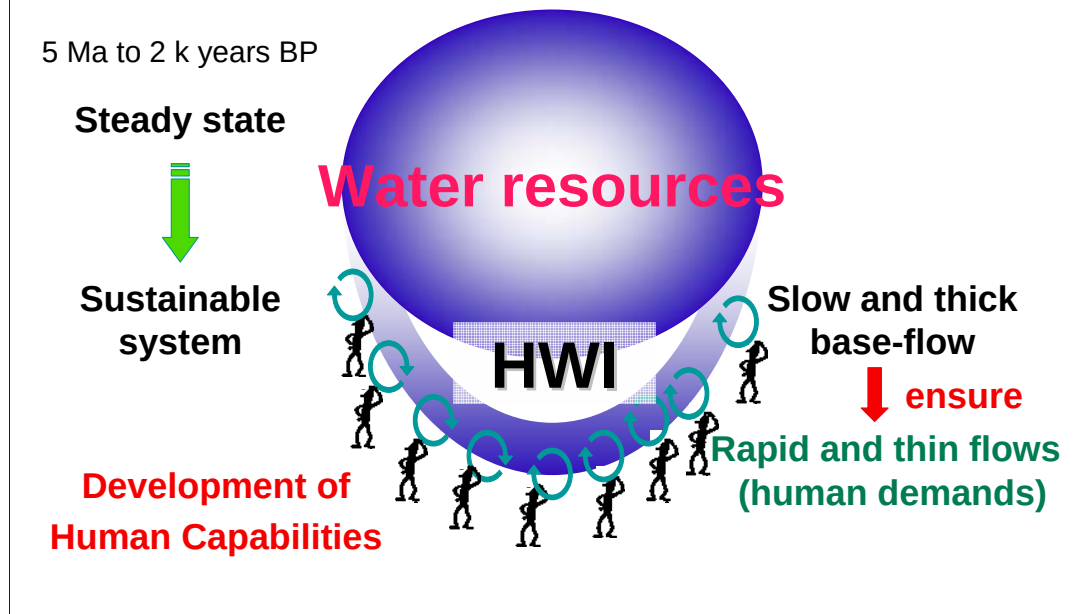
Biogeochemical cycling



Slide 3

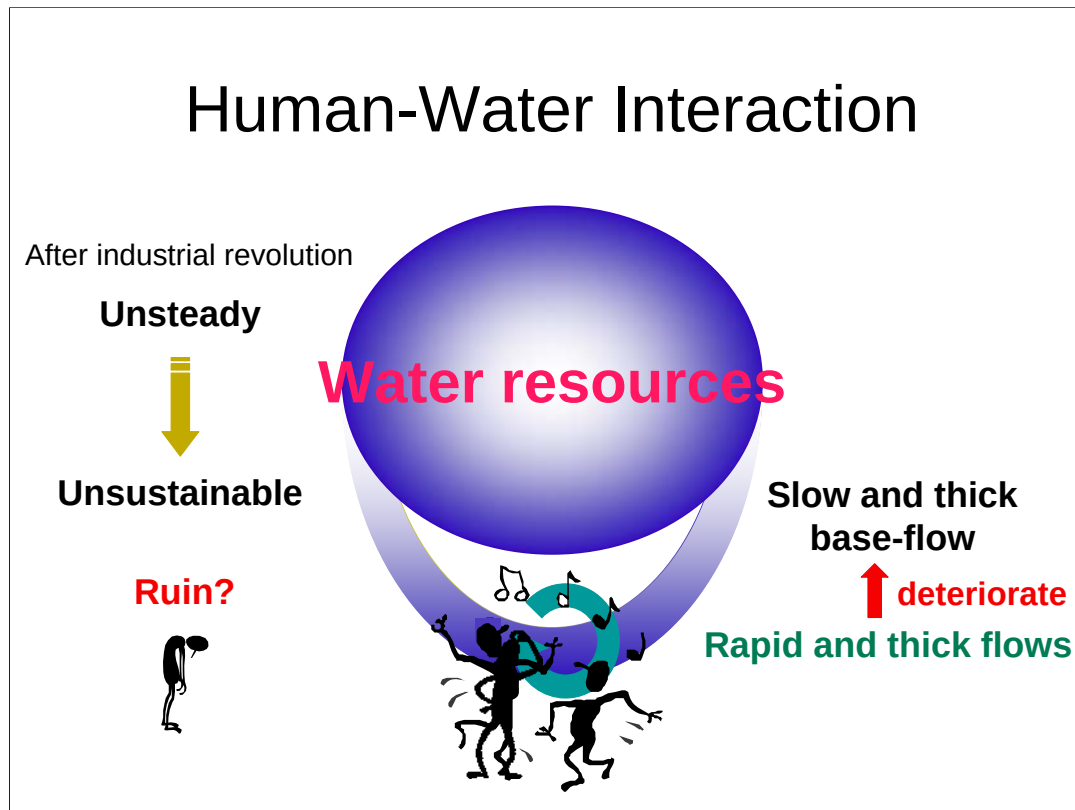
Various kinds of biogeochemical cycles have been developed on the earth. Those processes have been sustained by the slow and thick geological flow since about 4×10^8 years before present (BP) when the life emerged on the earth system. For thousands to millions years, the biogeochemical cyclings might be kept at steady state, unless the stock is exhausted.

Human-Water Interactions



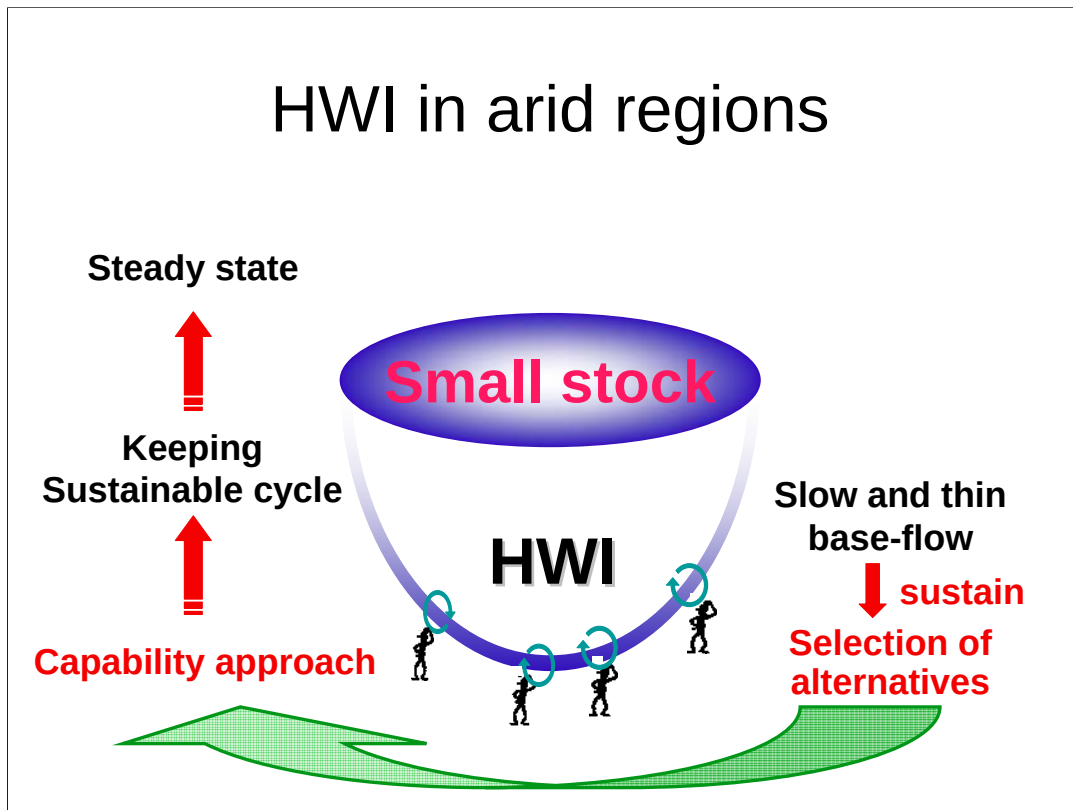
Slide 4

Steady states in the human-water interactions (HWI) might have been apparently maintained since the birth of human species (about 5×10^6 years BP). During the major part of the period, the water resource had been so huge and the base-flow of the water cycling had been so thick. Therefore, the HWI had been at the steady state, thus, the apparently sustainable system as a whole must have been maintained for 5 million years. Under this condition, the humankind could develop their capabilities.



Slide 5

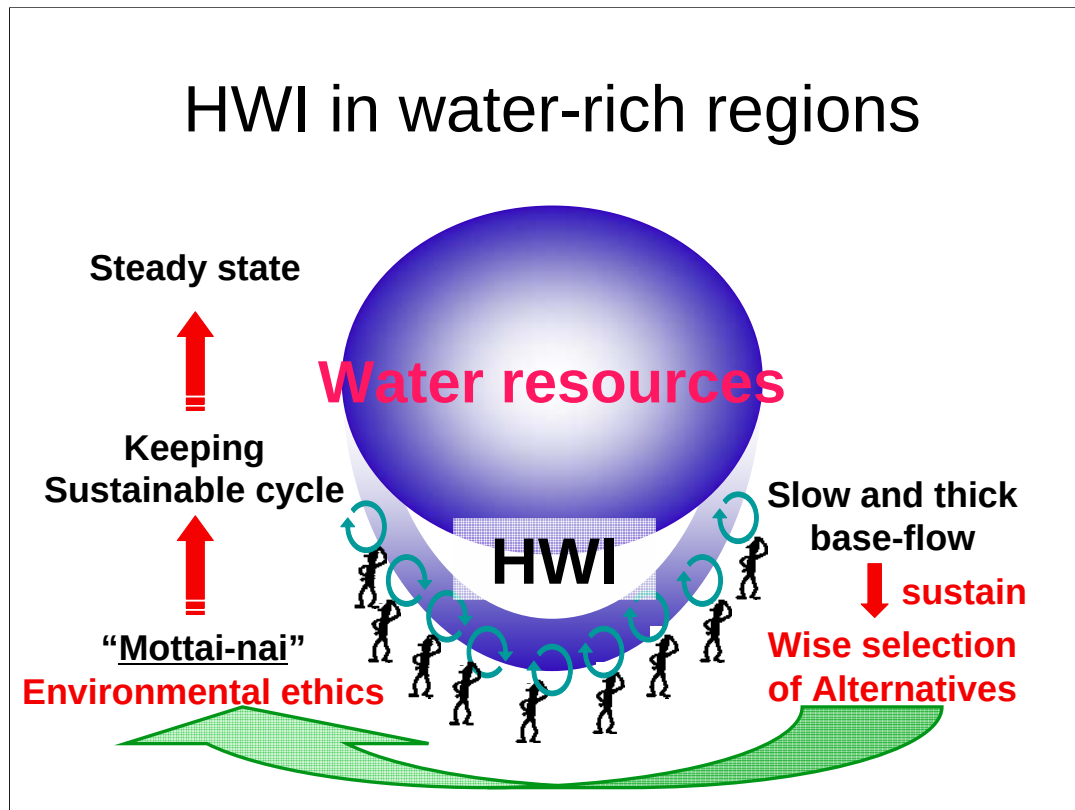
However, after the industrial revolution in the eighteenth century, human demands in the HWI have grown up to deteriorate the water cycle. "Water imbalance" occurred in this situation. It might lead ruins of the HWI and of the humankind. The constraint from the material cycling system cannot be overcome, as the first law of thermodynamics.



Slide 6

The twenty first century is thought to be the century of water. The shortage of water at arid regions would be the crucial issue. In arid regions, the stock of water is small and the basic flow of water is slow and thin. However, even such a limited base-flow of water can sustain some limited demands of humans. In this case, it is essential to select alternatives. How can people select an appropriate alternative in a specific place and social condition? How can they develop their capabilities on the water resource utilization? It may resemble to the <capability approach> proposed by Dr. Amartya Sen.

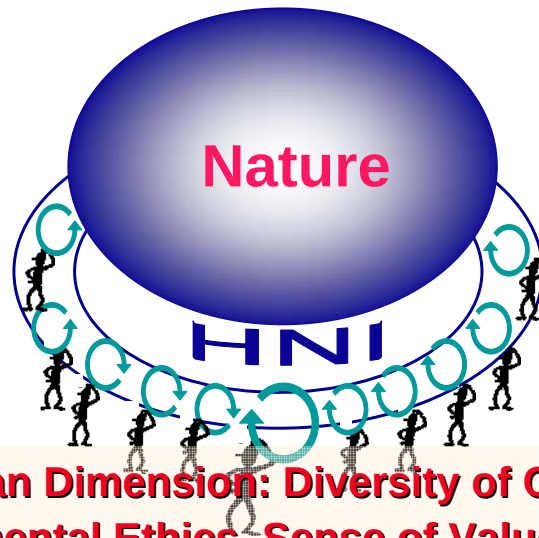
From the geochemical viewpoints, such approach should be taken with keeping sustainability of the system. Otherwise, corresponding alternatives should be given up. However, according to the historical records as presented by Dr. Nakawo, humankind have sometimes (often?) failed to select appropriate alternatives. , such approach should be taken with keeping sustainability of the system. Otherwise, corresponding alternatives should be given up. According to the historical records as presented by Dr. Nakawo, we humankind have sometimes fail to select appropriate alternatives.



Slide 7

In water-rich regions, like Japan, the base-flow of water can sustain many alternatives of humankind. However, the wise selection of alternatives must be critical to prevent from exhaustion and contamination of water resources. Eco-ethics or environmental ethics should be considered for the human life in the future. Japanese “Mottai-nai” seems to be one of the expressions on the environmental ethics relating to the wise selection of alternatives. This attitude can keep the system sustainable. This scheme cannot be applied to arid regions, because the small and thin base-flow severely restricts the human demand. However, the ethical approach would be also essential to solve environmental issues in those regions. Although the Virtual Water Trade (VWT) may be one of the wise selections, the biogeochemical cycle is not closed in the region. The VWT should be argued from the biogeochemical point of view as well as from the ethical one.

HNI in future



**For Human Dimension: Diversity of Capabilities,
Environmental Ethics, Sense of Value**

Slide 8

The scheme discussed here may be applied to the Human-Nature Interaction (HNI).

How can we develop a future relevant interaction between humans and the nature?

How diverse human capabilities to the nature are?

How do we select an alternative from our capabilities?

Mutual agreement or consensus on the environmental measures among stakeholders must be established in the course of the capability approach.

RIHN in future



**For Human Dimension: Diversity of Capabilities,
Environmental Ethics, Sense of Value**

Slide 9

Surveys of the view of value and the aim to change our life style would be main subjects for the better human life in future. We hope that so-called "Futurability" will be elucidated by the researches on the HNI. That may be a futurability of the RIHN.